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CURRENT LITERATURE

NOTES FOR STUDENTS

Temperature and respiration rate.—BLANC¹ has studied the effect of sudden changes in temperature upon the rate of respiration of plant parts. He reviews the work of ZIEGENBEIN² with germinated seeds of *Vicia Faba*, and that of PALLADIN³ with etiolated seedlings of the same species. These two investigators, although working with very similar material, came to very different conclusions as to the influence of sudden changes of temperature upon the rate of respiration. PALLADIN's conclusion that passing from a low temperature or from a high temperature to a medium temperature excites the respiration is considered doubtful on account of the fact that, previous to the change in temperature, the seedlings had been cultivated at different temperatures on sugar solutions.

BLANC worked with the embryos of *Phaseolus vulgaris* deprived of their cotyledons, with the ends of etiolated seedlings of *Vicia Faba*, and with young leaves of *Secale cereale*. The *Vicia* seedlings had previously been cultivated on 10 per cent saccharose or 5 per cent glucose solutions. The *Phaseolus* embryos and *Secale* leaves were used both with and without previous cultivation on 10 per cent saccharose solution. Raising the temperature at which the experiment was conducted invariably increased the rate of respiration, and lowering the temperature always decreased the rate. After having undergone one such change of temperature, samples of the material studied were returned to the original temperature for a short period (15-30 mins.). It was found that the rate of respiration during this second period at a given temperature was higher than that during the first period whenever the temperature had been raised during the intervening period, and lower whenever the temperature had been lowered during the intervening period.

In a third series of experiments, embryos of *Phaseolus vulgaris* and leaves of *Secale cereale* were changed from one temperature to a temperature about 20° C. warmer or 20° C. cooler, and the rate of respiration was determined for 3 successive 20-minute periods at the new temperature in comparison with the

¹ BLANC, M. L., Recherches experimentales sur l'influence des variations de température sur la respiration des plantes. Rev. Gén. Bot. 28:65-79. 1916.

² ZIEGENBEIN, E., Untersuchungen über den Stoffwechsel und die Athmung keimender Kartoffelknollen sowie anderer Pflanzen. Jahrb. Wiss. Bot. 25:595-596. 1893.

³ PALLADIN, W., Influence des changements de température sur la respiration des plantes. Rev. Gén. Bot. 11:241-257. 1899.

rate at the original temperature. It was found that after a change in temperature, the corresponding change in respiratory activity took place only gradually, apparently not having reached an equilibrium even at the end of the third 20-minute period. Although the main point is proved, the value of this part of the work would have been increased by continuing the observations over a longer time.

Many students will regret that the author did not study oxygen consumption as well as the production of CO₂, to see whether the respiratory coefficient was altered by temperature changes. It should be remembered, too, that the conclusions reached may not hold good for other sorts of material, such as dormant seeds, the germination of which is greatly stimulated by alternations of temperature.—G. T. HARRINGTON.

Ecology of bryophytes and lichens.—Ecological studies of liverworts and mosses have not been numerous in the past, largely because bryologists have not been interested in ecology and ecologists have not been sufficiently acquainted with bryophytes. There are also some difficulties peculiar to the application of ecological principles to these plants. Some of these have been pointed out by WATSON⁴ in attempting, among other things, to define a xerophytic bryophyte. This he decides must be a plant capable of withstanding long periods of dryness and of having at the end of such periods sufficient living cells to enable it to resume its growth quickly when water becomes available. He proceeds to consider the "xerophytic adaptations" under the two principal heads of structures causing (1) reduction of water output and those resulting in (2) water storage. The former is accomplished by such means as cushion forms, investments of dead cells, thick cell walls, leaf arrangement, and capillary structures; the latter by water sacs, water-storing cells, mucilaginous cells, and succulent tissue. The writer, however, warns us that many bryophytes exhibiting "xerophytic adaptations" are not xerophytes.

A second paper by the same authors gives in detail the zonation of bryophytes in a wet heath. The shallow water zone is dominated by *Aneura pinguis*, *Pellia epiphylla*, *Hypnum scorpioides*, and *Sphagnum cymbifolium*; the second zone, just above water level, is dominated by *Aneura multifida*; a third zone consists of *Sphagnum subnitens*, *Hypnum intermedium*, and associated forms, passing imperceptibly into a fourth zone, characterized by *Hypnum cuspidatum*, and closely followed by a fifth zone dominated by *Brachythecium pyrum* and *Cephalozia connivens*. This is frequently the end of the series, although occasionally the drier tussocks show a sixth zone of *Hypnum cupressiforme* var. *ericetorum*. Drainage and the accumulation of humus are the chief

⁴ WATSON, W., Xerophytic adaptations of bryophytes in relation to habitat. *New Phytol.* 13:149-169, 181-190. 1914.

⁵ ———, A Somerset heath and its bryophytic zonation. *New Phytol.* 14:80-93. 1915.